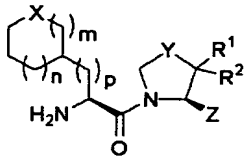
Claims

1. An α-amino acid derivative of the formula (I)



(I)

wherein

R^1 is a hydrogen atom, a halogen atom, alkyl or alkoxy,

R^2 is a hydrogen atom, a halogen atom, a hydroxyl group, alkyl or alkoxy, or

R^1 and R^2 are joined to form oxo, hydroxyimino, alkoxyimino or alkylidene,

X is $CH-R^3$ or $N-R^4$,

Y is CR^5R^6

wherein R^5 and R^6 are each a hydrogen atom, a halogen atom, a hydroxyl group, alkyl or alkoxy, or R^5 and R^6 are optionally joined to form oxo, hydroxyimino, alkoxyimino or alkylidene,

S, S=O or SO_2,

Z is a hydrogen atom or cyano,

m and n are each 0, 1 or 2, wherein the sum of m and n is 1, 2 or 3,

p is 0, 1, 2 or 3,

R^3 is $-NR^7R^8$

wherein R^7 and R^8 are optionally the same or different and each independently is a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl or heteroarylalkyl, or are optionally bonded to each other to form heterocycle having at least one nitrogen atom, and optionally having other further hetero atom(s),

wherein the heterocycle is optionally substituted or condensed with an aromatic ring optionally having substituent(s),

$-NR^9COR^{10}$

wherein R^9 and R^{10} are optionally the same or

different and each independently is a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, arylalkenyl, heteroaryl, heteroarylalkyl or heterocycle,

$-NR^{11}CONR^{12}R^{13}$

wherein R^{11}, R^{12} and R^{13} are optionally the same or different and each independently is a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl or heteroarylalkyl, or R^{12} and R^{13} are optionally bonded to each other to form heterocycle having at least one nitrogen atom, and optionally having other further hetero atom(s),

wherein the heterocycle is optionally substituted or condensed with an aromatic ring optionally having substituent(s),

$-NR^{14}SO_2R^{15}$

wherein R^{14} and R^{15} are optionally the same or different and each independently is a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl or heterocycle,

$-OR^{16}$ or $-OCOR^{17}$

wherein R^{16} and R^{17} are each a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl or heterocycle, and

R^4 is a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, heterocycle, $-COR^{18}$

wherein R^{18} is a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, arylalkenyl, heteroaryl, heteroarylalkyl or heterocycle,

$-CONR^{19}R^{20}$

wherein R^{19} and R^{20} are optionally the same or different and each independently is a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl or heteroarylalkyl, or R^{19} and R^{20} are

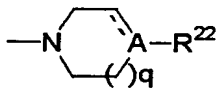
optionally bonded to each other to form heterocycle having at least one nitrogen atom, and optionally having other further hetero atom(s),

wherein the heterocycle is optionally substituted or condensed with an aromatic ring optionally having substituent(s), or

$-SO_2R^{21}$

wherein R^{21} is alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl or heterocycle,

provided that when p is 0, then X is $CH-R^3$, and R^3 shows the formula (II)


(II)

wherein

⋯⋯ is a single bond or a double bond,

R^{22} is aryl or heteroaryl,

Q is 1 or 2, and

A is a carbon atom or a nitrogen atom,

provided that i) when A is a carbon atom, then A is optionally substituted by a hydroxyl group, carboxyl or alkoxycarbonyl, and ii) when A is a nitrogen atom, then

⋯⋯ is a single bond,

wherein, of the above-mentioned groups, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl and heterocycle optionally have substituent(s),

or a pharmaceutically acceptable salt thereof.

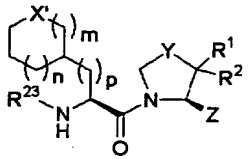
2. The α-amino acid derivative of claim 1, wherein, in the formula (I) of claim 1, m = 2, n = 0 and $X = CH-R^3$, or a pharmaceutically acceptable salt thereof.

3. The α-amino acid derivative of claim 1, wherein, in the formula (I) of claim 1, R^3 is the formula (II) of claim 1, or a

pharmaceutically acceptable salt thereof.

4. The α-amino acid derivative of claim 3, wherein, in the formula (I) of claim 1, Y = S and $R^1 = R^2 = Z = H$, and in the formula (II) of claim 1, q = 1 and A = N, or a pharmaceutically acceptable salt thereof.

5. A compound of the formula (III)



(III)

wherein

X' is $CH-R^3$, $N-R^4$ or C=O,

R^{23} is $-COR^{24}$

wherein R^{24} is a hydrogen atom, alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl or heterocycle, or

$-COOR^{25}$

wherein R^{25} is alkyl, cycloalkyl, cycloalkylalkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl or heterocycle, and

other symbols are as defined in claim 1.

6. The compound of claim 5, wherein, in the formula (III), X'= C=O.

7. A pharmaceutical composition comprising an α-amino acid derivative of any of claims 1 to 4 or a pharmaceutically acceptable salt thereof and a pharmacologically acceptable carrier.

8. A DPP-IV inhibitor comprising an α-amino acid derivative of any of claims 1 to 4 or a pharmaceutically acceptable salt thereof.

9. An agent for the prophylaxis and/or treatment of a disease relating to a DPP-IV inhibitor, which comprises an α-amino acid derivative of any of claims 1 to 4 or a pharmaceutically acceptable salt thereof as an active ingredient.

10. An agent for the prophylaxis and/or treatment of diabetes or obesity, which comprises an α-amino acid derivative of any of claims 1 to 4 or a pharmaceutically acceptable salt thereof as an active ingredient.

11. The method of producing a compound of claim 5 wherein X' is represented by $CH-R^3$, which comprises use of a compound of the claim 6 as an intermediate.

12. The method of producing a compound of any of the claims 1 to 4, which comprises the production method of claim 11.